Updates:
MicroBooNE Reception Test (MRT)
Rack Infrastructure

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Electronics Reception Test Stand

- When electronics arrive, we need to separately test every piece in electronics chain:
  - Motherboards
  - Feedthrough electronics: controls and intermediate amplifiers
  - Cold and warm cables
- Have designed a 3-step test that will do this:

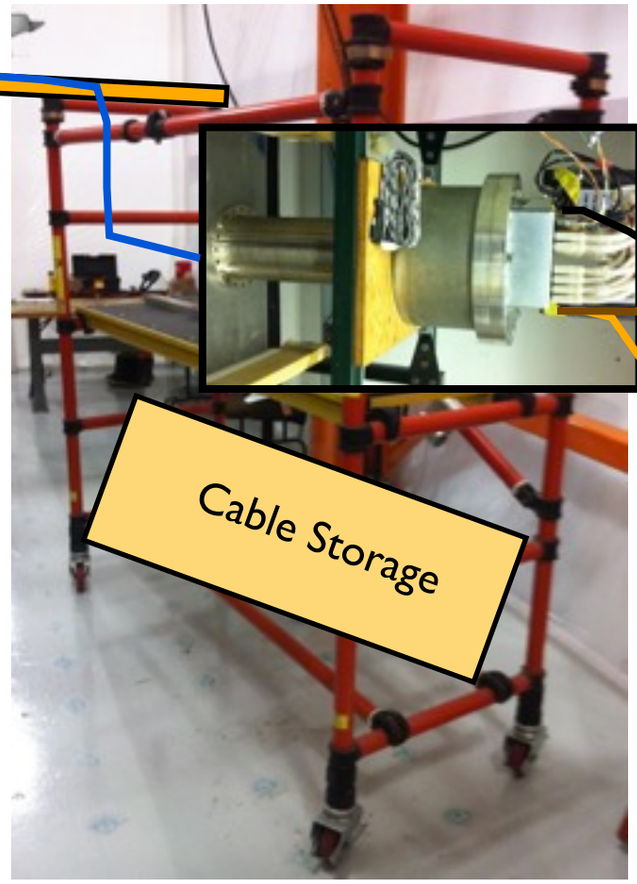
Step	Production Components	Previously-Tested Components
1	Motherboards	Flange and electronics Cold, warm cables
2	Motherboards, Cold cables	Flange and electronics, warm cables
3	Motherboards, cold cables, feedthroughs and electronics	Warm cables

Step 1

Power Cable
Lemo cable
HDMI Cable: 20’
USB Cable: 20’
Fiber - Multimode 62.5 mm: 200’
Ethernet Cable
‘Test’ Warm Cable: 10m
‘Test’ Cold Cable

x24

Motherboard



Rolling Scaffolding and Flange

x2
x2
x24
x2

Rolling Electronics Rack

TPCI-4 (FRONT)
NIM Bin
Fan
Pulser
Pulser Fan-out
ASIC C/C Chassis
Scope
Cable Dressing Area
TPC #1
FAN TRAY
TPC POWER SUPPLY
LV Module
MPOD
Ranger Box (in back)
Eaton Power Strip (in back)

DAQ Rack: In HV Cage

TPCI-4 (FRONT)
Ranger Box
DAQ Computer
Keyboard/Monitor
Power Strip

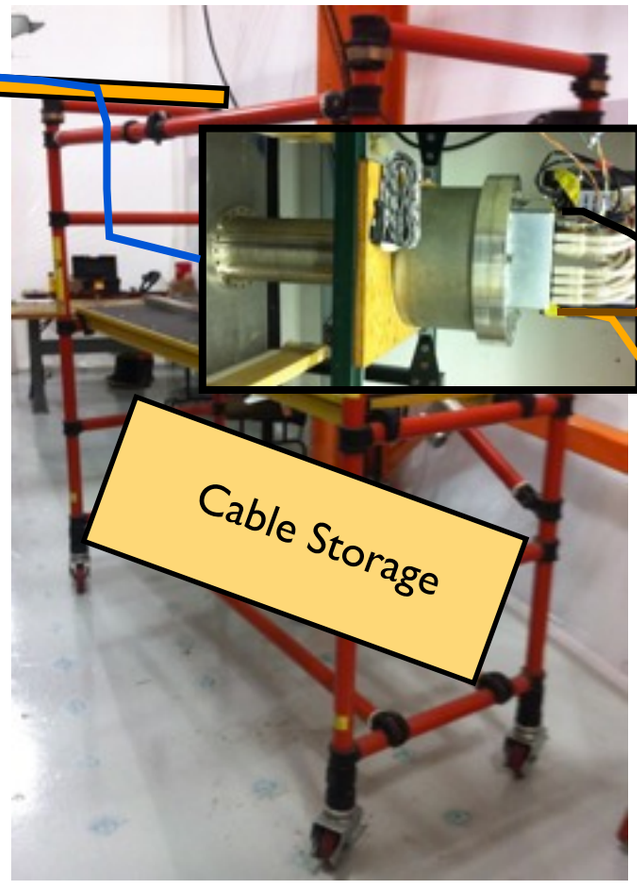
To Network
To 120V AC
To 208 3-phase AC

Step 2

Power Cable
Lemo cable
HDMI Cable: 20’
USB Cable: 20’
Fiber - Multimode 62.5 mm: 200’
Ethernet Cable
‘Test’ Warm Cable: 10m
Production Cold Cable

x24

Motherboard



Rolling Scaffolding and Flange

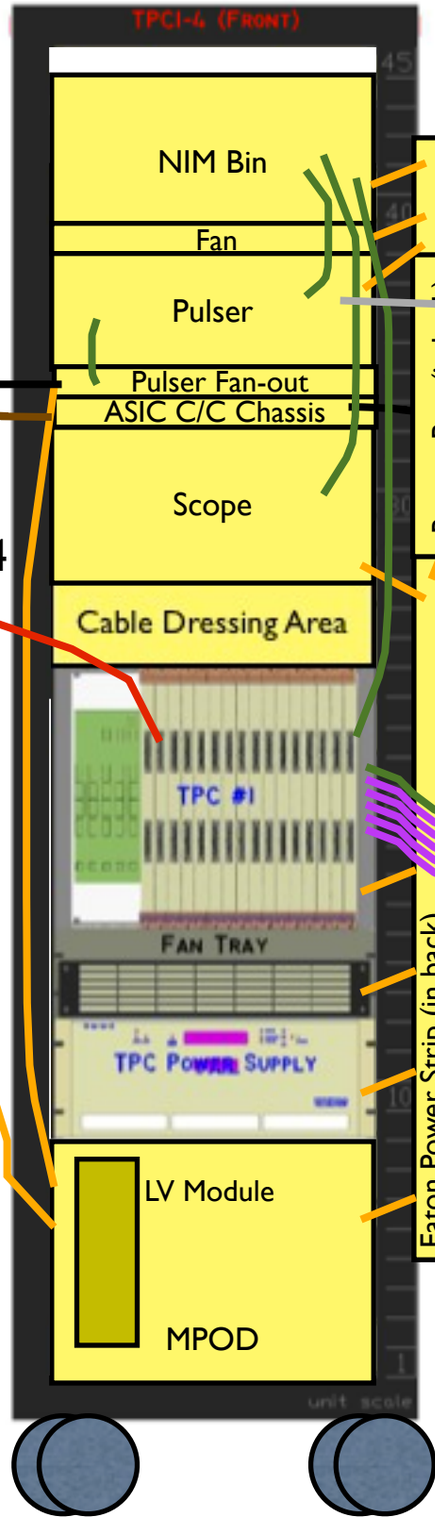
x2

x2

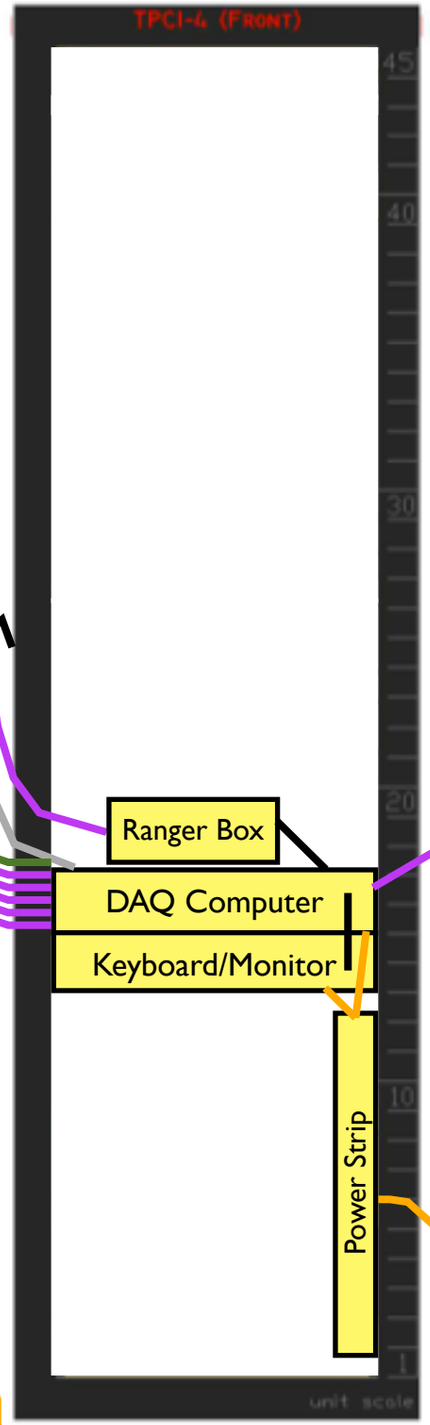
x24

x2

Rolling Electronics Rack



DAQ Rack: In HV Cage



To Network

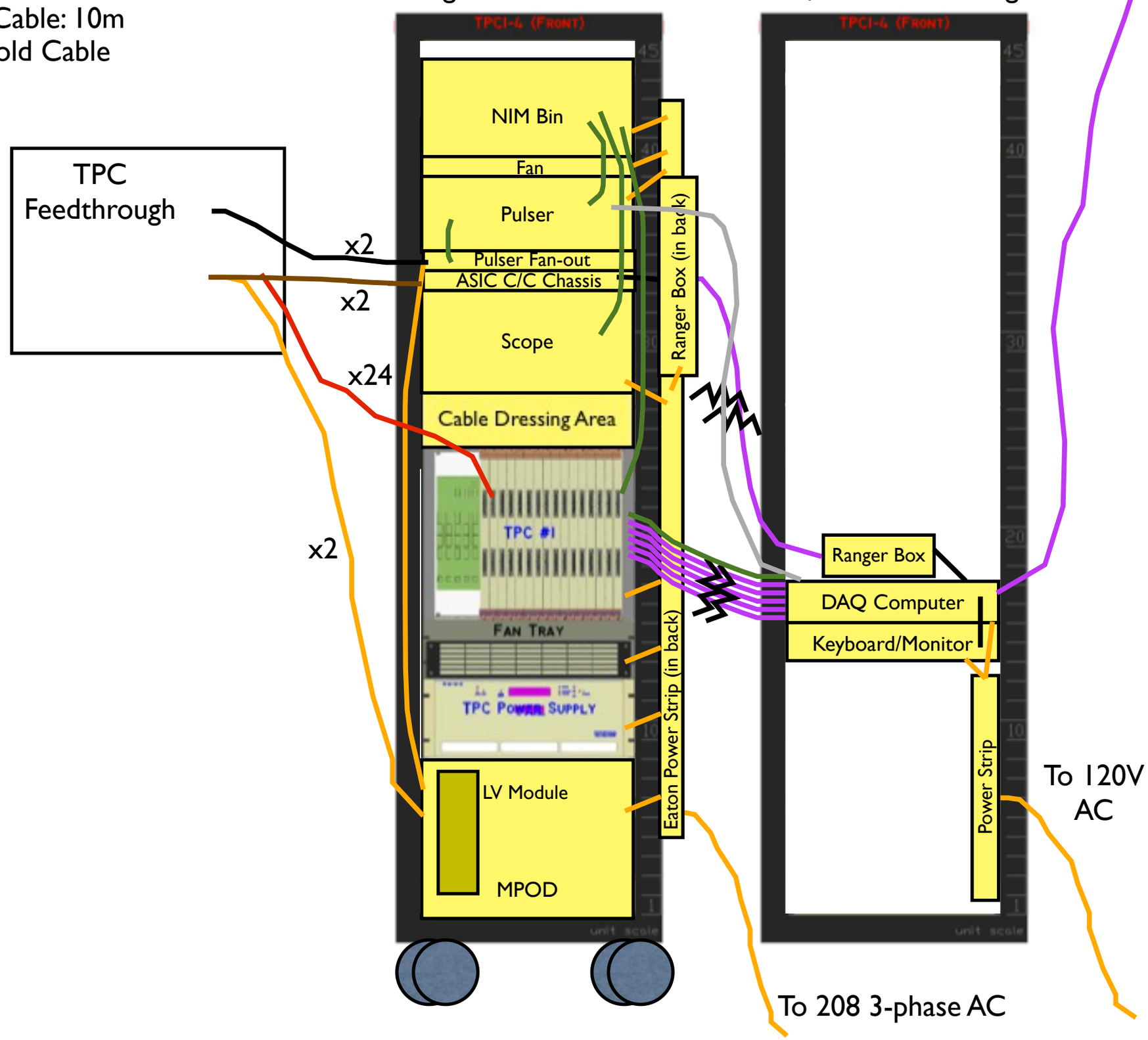
To 120V AC

To 208 3-phase AC

Power Cable
Lemo cable
HDMI Cable: 20’
USB Cable: 20’
Fiber - Multimode 62.5 mm: 200’
Ethernet Cable
‘Test’ Warm Cable: 10m
Production Cold Cable

Step 3

Rolling Man Lift OR Scaffolding



Schedule: Last Meeting

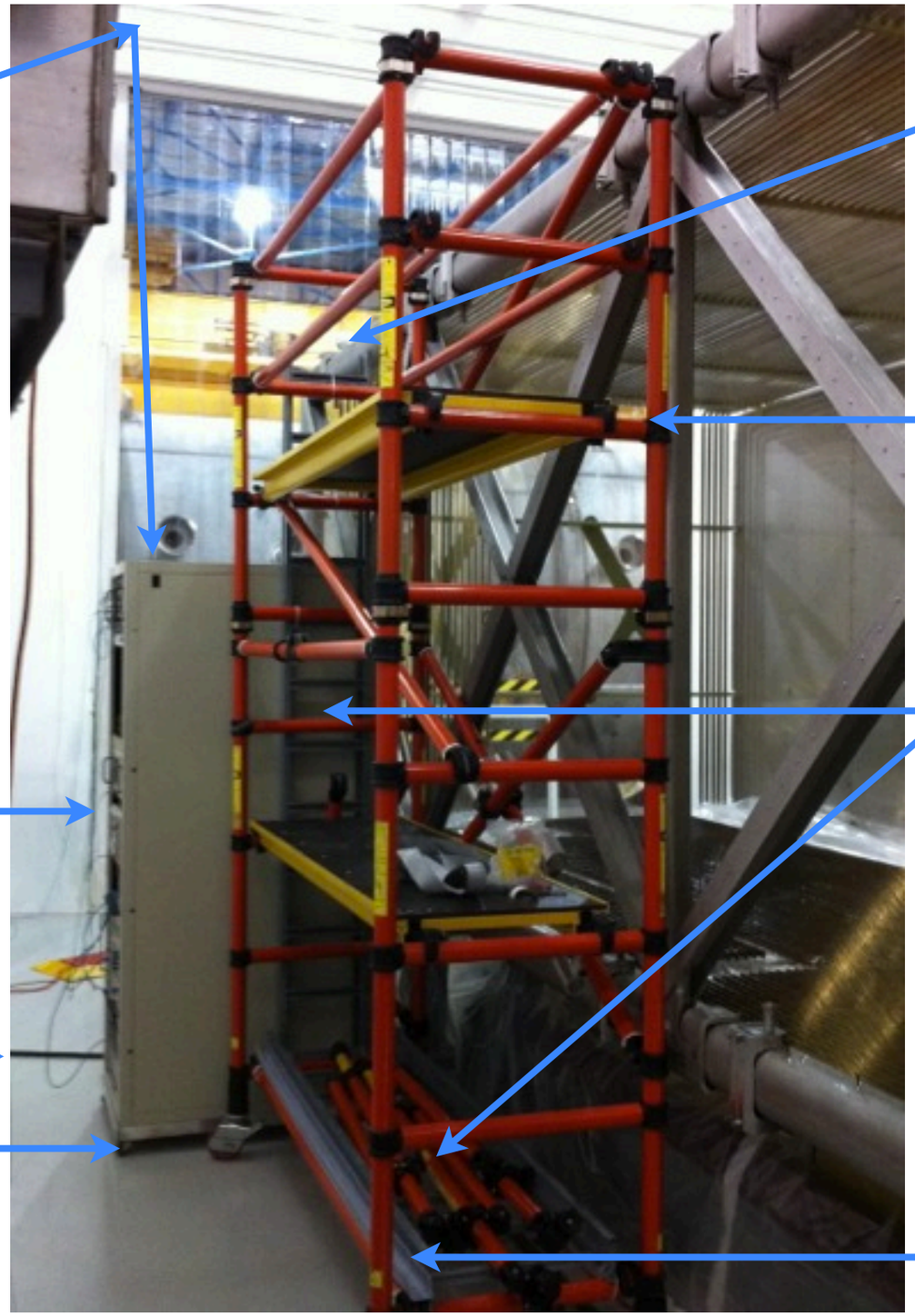
- DONE: DAQ has been installed in HV crate
- DONE: Rolling server rack next to HV crate for build-up
- March 11-15: Get 208 3-phase power to rolling rack by HV crate
- March 11-15: Wiener PS load test
- March ~18: Readout crate, FEM+ADC, trigger module, PCIe arrive
- March 18-29: Install Wiener PS, Readout crate, DC fusing
- March 11-29: Construct TPC readout crate fan
- April 1-5: Install and test FEM/ADC/Trigger/PCIe
- April - Mid May:
  - BNL parts arrive: Motherboards, cold/warm cables, test flange, etc -- Jonathan is talking to Chen for exact dates
  - Load-test MPOD and LV power supplies
  - Design/build LV ASIC and pulser power cords and MPOD LV interconnect
  - Long fiber arrives, is routed to TPC tent
  - Install into rack: pulser, pulser fan-out, ASIC config/control chassis

Schedule: Now

- DONE: DAQ has been installed in HV crate
- DONE: Rolling server rack next to HV crate for build-up
- March 11-15: Get 208 3-phase power to rolling rack by HV crate
- March 11-15: Wiener PS load test
- March ~18: Readout crate, FEM+ADC, trigger module, PCIe arrive
- March 18-29: Install Wiener PS, Readout crate, DC fusing
- March 11-29: Construct TPC readout crate fan
- April 1-5: Install and test FEM/ADC/Trigger/PCIe
- Mid April - End May:
  - Build LV ASIC and pulser power cords
  - Install into rack: pulser, pulser fan-out, NIM bin, fan, Wiener, cable routing grate and shelves
  - Long fiber arrives, is routed to TPC tent
  - Next week: Install long Lemo cable for GPS card testing in MRT
  - Next week: label and lay warm cables, power cables, USB, HDMI in scaffolding
  - Next week: Load-test MPOD and LV power supplies; install in rack
  - BNL parts arrive: Warm cables, motherboards, cold cables, test flange, flange electronics

Stand Infrastructure

- Stand as it looks right now



Data, command, GPS cables from/to HV cage

Test flange goes here

Platform for reaching motherboards, connecting cold cables; Need to lower this 16”

44U Server rack and attendant electronics

Metal tray for excess data cable (fiber, 10m warm cables)

Rack power from tent power unit

Wheeled cart

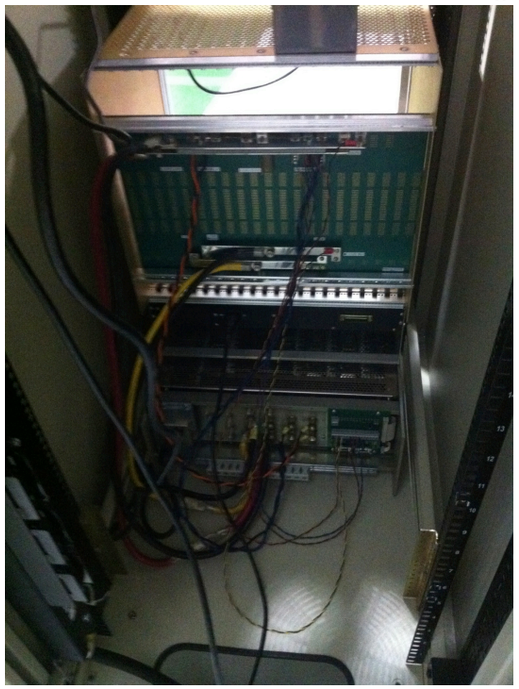
Plastic tray for excess power cable

Visuals

- MRT status photos:

Warm Cables at DAB

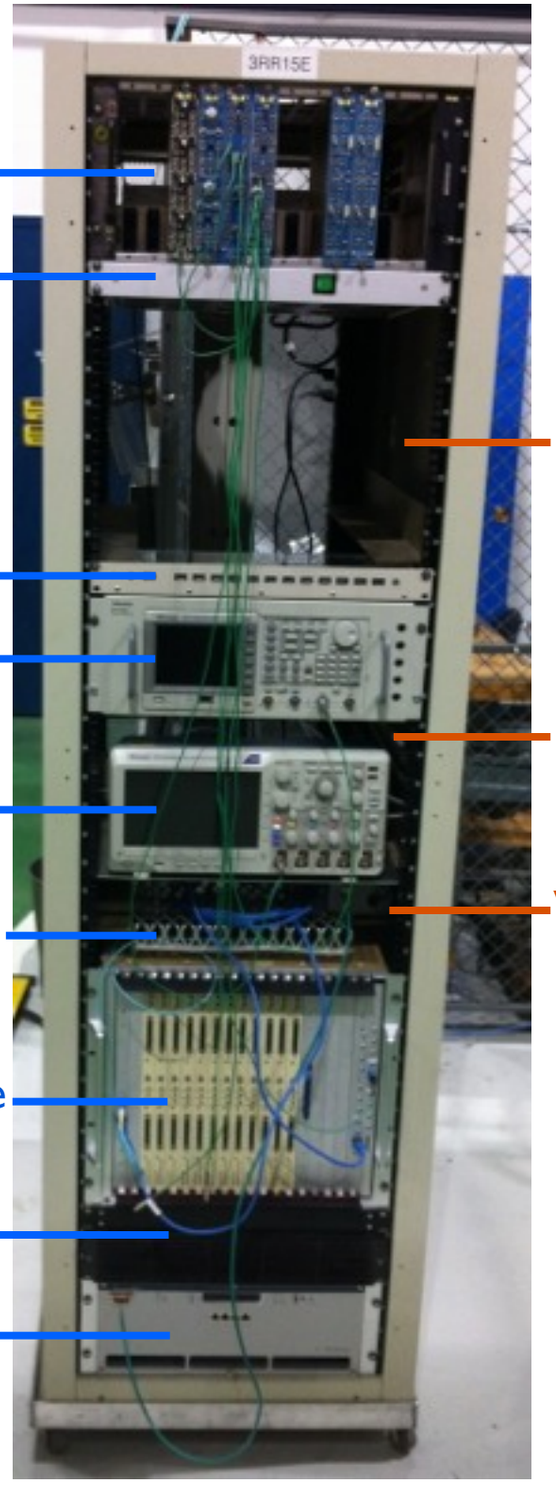
MRT Rack Back:
DC Distribution and Fusing



ASIC and Pulser Fanout Power Cables

Data and command Cables

MRT Rack Front



Rack Infrastructure

Rack Infrastructure

- Want to wait on rack build-up until summer help arrives:
  - TPC readout fan construction
  - AC switch/distribution boxes
  - DC fusing
  - Rack protection chassis
  - Power cables
  - Temperature sensors
  - Slow Control Chassis
  - Installation of all components in racks and cable tray and cable routing
- In meantime:
  - Technical procedures have been written by Dave H and Linda
  - User-friendly step-by-step instructions being written by Bryce
  - Organizing rack infrastructure construction *infrastructure:* where, who, how
  - Testing, designing, prototyping many rack components

Build-Up: What/How

- LOTS of documentation:
  - Rack Builds: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/Racks.html
  - AC Switch Box: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/ACSwitch.html
  - TPC Fan: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/FanPackRefurbish.pdf
  - RPS Chassis: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/RPS.html
  - DC Fusing/Distribution:
    - http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/CrateDC.pdf
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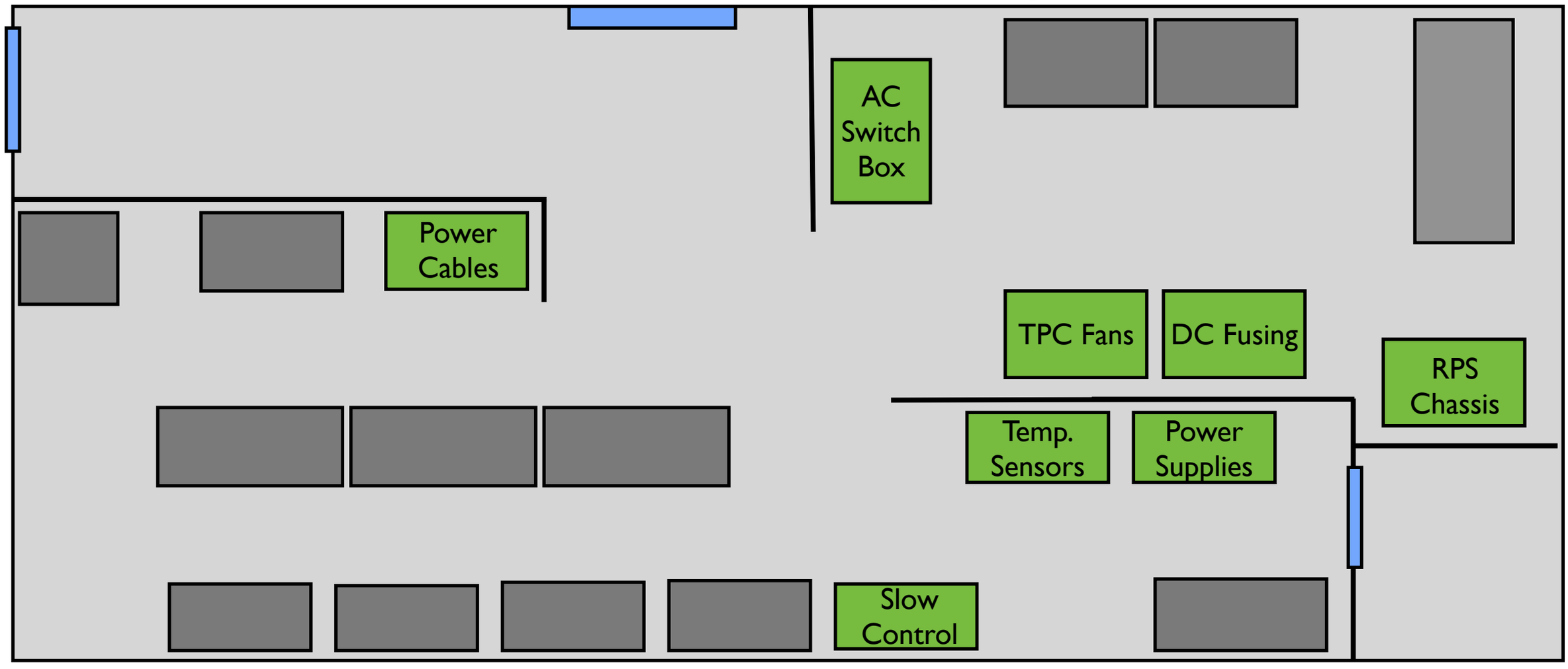
    - Power Supply AC Fuse: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/AC%20Cover%20w%20Strain%20Relief%20and%20Fuse.pdf
  - Warm Cables: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/FrontEndCableLengths2.pdf
  - Slow Control / Temperature Sensors: http://www-ppd.fnal.gov/EEDOffice-w/Infrastructure_group/Huffman/Web/uboone/SlowControl.html
- Links/DocDB for user-friendly instructions on the way!

Build-Up: Where

- Plenty of space in annex for component construction
- Build-up of racks in DAB high bay
- Warm cable labelling, mock-laying: high bay, 5th floor DAB

Rack Infrastructure Build-up Map: DAB Annex



Build-Up: When

- MRT Built up by late May; then shift to rack build-up
- Summer students arrive early June

MAY

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JUNE

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

JULY

SUN	MON	TUE	WED	THU	FRI	SAT
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7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

AUGUST

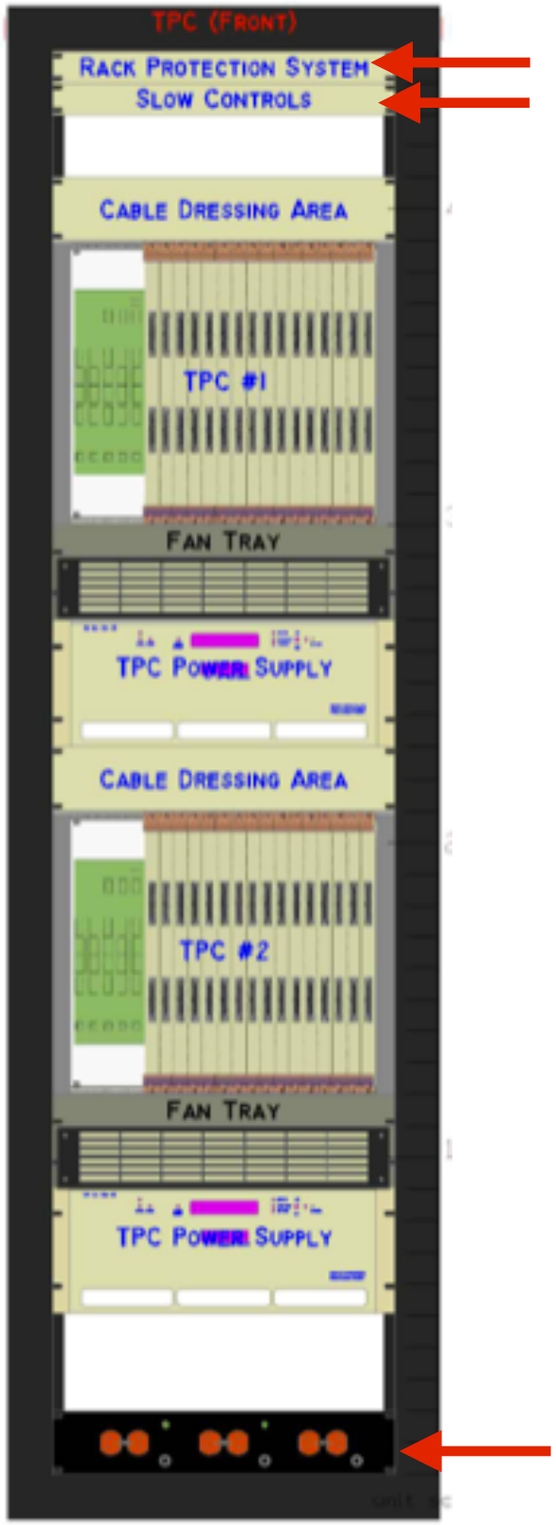
SUN	MON	TUE	WED	THU	FRI	SAT
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

- TPC crates arrive in late August
- Aim to have most components made and loaded into racks by this date
- Roughly three months to work with

Build-Up: Who

- Lots of stuff to do!
- Have heard from some groups already volunteering summer students, grad students, postdocs
  - Many good encapsulated summer-long hardware projects
- Let me or Linda know if you have interest!

General Rack Infrastructure



- Rack Protection System:
  - Smoke detectors wired up
  - RPS chassis built, reviewed
  - AC Interlock/Dist: built, reviewed
  - Both have been exercised in DAQ test stand

Wired Smoke Detectors

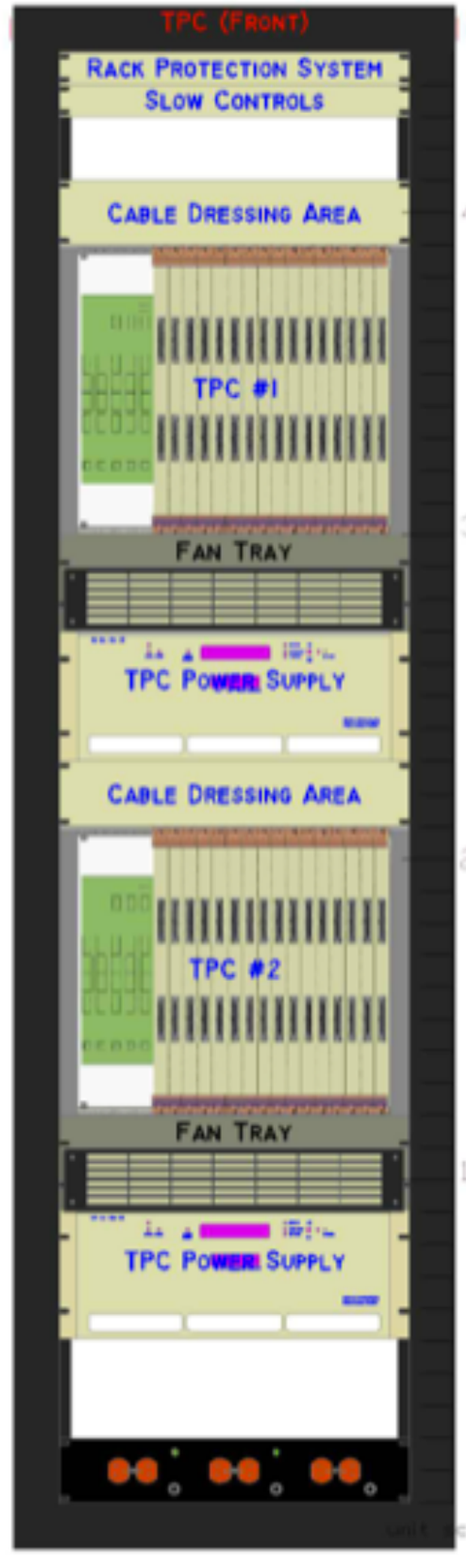
Prototype Rack Protection Interlock Box

AC Distribution Box

- First production fan built, reviewed
  - Will be exercised in MRT
- Slow Controls: see monitoring talk later today

TPC Racks

- TPC RO Crates: Delivery in late August
- Dressing area designed, parts available
  - Same design as DAQ test stand, MRT
- 10 Wiener PS at DAB: all load-tested
- Have already done DC distribution/fusing for MRT and DAQ test stand
  - Currently writing up easy step-by-step instructions for summer build-up



TPC Rack outline

Power Supply Rack

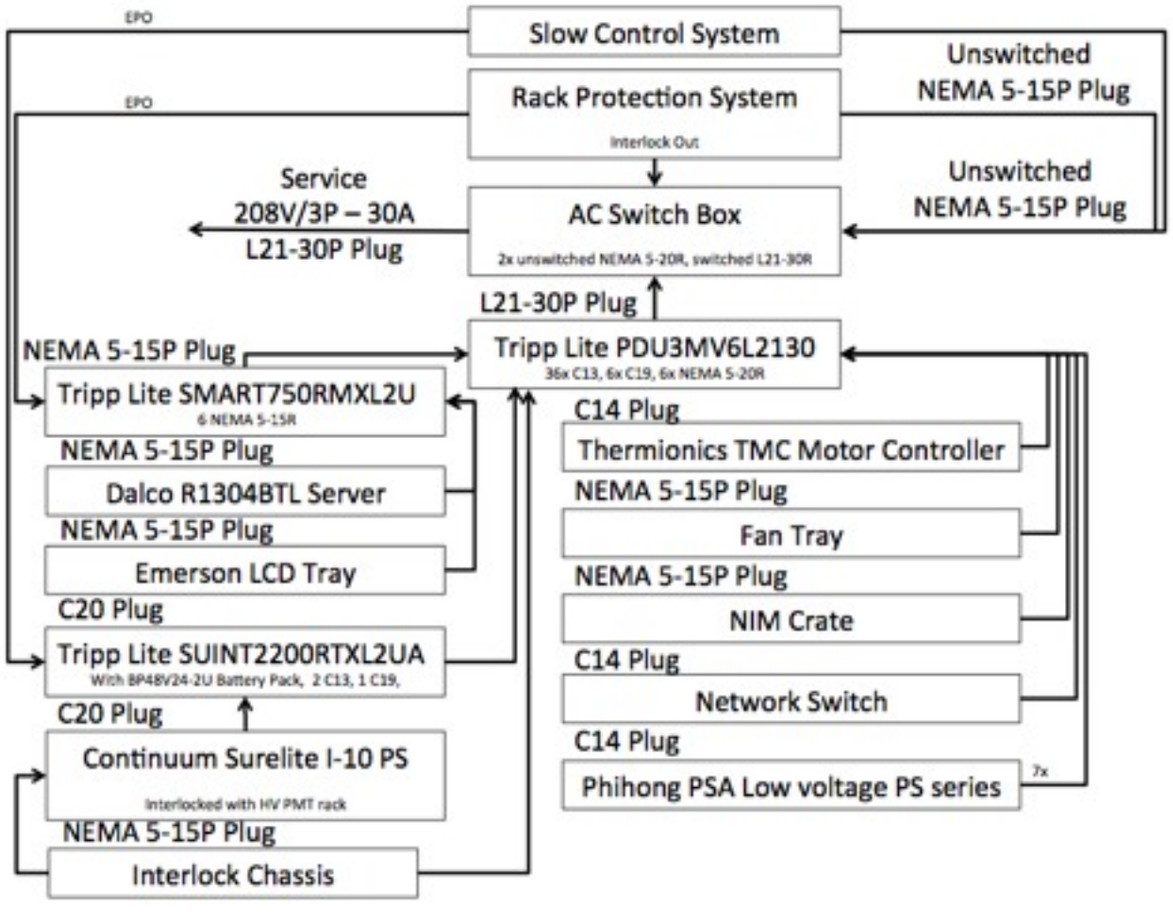
- MPOD, LV modules in DAB
  - Load testing happening next week or weed after
  - Bias voltage modules arrive in the next month or so
- LV, HV interconnect must be designed, built
  - Dave and Linda have a preliminary design in mind
- ASIC config/control chassis built, reviewed
  - Will be exercised in MRT tests
- Pulser bought and available at DAB
  - Will be exercised in MRT tests
- Pulser fanout built, reviewed
  - Will be exercised in MRT tests

PS Rack outline

Laser Rack

- Design now firmed up: see laser talk
- Many components already at DAB

Laser Rack AC Distribution Scheme



Laser Rack outline

Rack Protection System
Slow Control Chassis
Network Switch

NIM Crate

Fan Tray

AC Switch Box

Interlock Chassis

Thermionics Stepper Motor Controller

Phihong LV PS Assembly & Mounting Area

UPS SMART750RMXL2U
ExSys Port Replicator
Emerson Avocent LCD Console Tray

DALCO R1304BTL 1U Rack mount Server

Battery Pack BP48V24-2U

UPS SUINT2200RTXL2UA

Continuum Surelite I-10 PS

42U Server Rack with 29.5” depths

Other Racks

- DAQ Racks
  - DAQ computers are in; see DAQ talk
  - Will install DAQ computers and racks at LArTF sooner rather than later: maybe by the end of May?
- PMT/Trigger Rack
  - Need to design/build an clock / TPC power supply interlock...
- HV Rack
  - Nothing to report
- Com, Accel
  - Nothing to report
- Cryo Purity Monitor
  - Nothing to report

Summary

- Construction of MRT is nearly complete
  - Most components are on site and ready to go
  - Test stand will be ready for electronics testing when motherboards are seated
  - By next meeting, Wes should be able to show the results of the MRT tests!

- Continuing to lay groundwork for full rack build-up
  - Many parts designed, prototyped, tested
  - A few parts left to design and test
  - Planning now for rack build-up this summer